

Summary of Independent Expert opinion on:

Groundwater contamination of the proposed quarrying activity at Hatfield Aerodrome

Use: Development Control Committee (Hertfordshire CC) Meeting September 24th, 2020

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Serious evidence relating to groundwater giving grounds for rejection or deferment is summarised below with detailed supporting evidences in my report (18/03/2020) previously provided in response to the Hertfordshire CC consultation on the Groundwater Management Plan (GWMP) (Final v5).

- 1. The most significant groundwater-related problems/*risks*** arising from the proposed development stem from the proposed **excavation of the lower mineral horizon (LMH) gravels** located below the protective boulder clay and overlying the Chalk aquifer. This activity seriously jeopardises:
 - protection of Chalk aquifer groundwater resource used for public drinking water supply to many;
 - optimal remediation of the >20 km bromate/bromide groundwater plume, Europe's largest.
- 2. The Environment Agency has proposed three 'EA Conditions' that will not be met, or are very likely not to be met in my opinion**, primarily as a consequence of gravel extraction from the LMH.
- 3. Regarding EA Condition ii, "*any activities close to the plume must not change the existing hydrogeological flow regime*", this condition will be permanently breached during and following** development by the proposed replacement of excavated permeable sand-&-gravel aquifer LMH formation with the permanent insertion of c4.4 million tonnes of low permeability clay backfill across the site. This will cause considerable changes to the existing LMH hydrogeological flow regime. Groundwater flows will be deflected around, rather than pass through the current site; some groundwater flowlines previously extracted by the Bishop's Rise bromate plume remediation scavenger well **no longer able to be extracted** [per Report Figure 1].
- 4. The knock-on impact of failure to meet EA Condition ii, is *failure to meet EA Condition iii – "any activities close to the plume must not interfere with the remediation of the bromate and bromide pollution"*. The proposed low permeability backfill of the LMH void will effectively 'push' parts of the adjacent, bromate/bromide plumes in the surrounding LMH gravel aquifer away from the site, potentially beyond the reach of the Bishop's Rise scavenger well, increasing risk of diverted bromate/bromide plumes migrating to other, currently clean, public water supply wells** [Report Figure 2].
- 5. Regarding EA Condition i "*No mineral is extracted from within the existing plume of bromate and bromide groundwater pollution*", bromate groundwater contamination in the LMH/chalk at the Quarry Site is significantly controlled by pumping rates of the Bishop's Rise scavenger well [Report Figure 3]. Higher pumping rates of 4 to 5 megalitres per day preferred for optimal plume capture will cause greater 'drag' of the bromate plume into the site LMH aquifer gravels to be quarried, thereby breaching EA Condition i. Recent observations of low, but significant bromate at the Site perimeter, with very high bromate nearby, likely arise from lower scavenger well pumping rates in recent years (due to operational issues). Bromate is expected to increase on the Quarry Site with resumption of higher scavenger pumping rates. Hence, viability of meeting EA Condition i is not controlled by the Site developer, but by the scavenger well operator, and their objectives.**
- 6. Hence, primarily due to the inappropriate choice of quarry Site location: between the bromate source and single scavenger remediation well, quarry development meeting EA Condition i would require scavenger well pumping rates to be sub-optimal for remediation.** This is not appropriate and breaches EA Condition iii, interference with remediation of the bromate/bromide pollution.
- 7. The need to optimise remediation of what is Europe's worst and largest bromate groundwater plume to safeguard many other public water supply borehole sources in Hertfordshire is paramount. Given the severity of the groundwater pollution and the expected breaching of EA Conditions, such quarry development is not considered appropriate.**